Tertiary Coals in South Texas: Anomalous Cannel-Like Coals of Webb County (Claiborne Group, Eocene) and Lignites of Atascosa County (Jackson Group, Eocene) -Geologic Setting, Character, Source-rock and Coal-bed Methane Potential

Field Trip Guidebook

The 1999 AAPG Annual Convention Energy Minerals Division Field Trip # 15 April 14-15, 1999

Leaders: Peter D. Warwick, U.S. Geological Survey, Reston, VA, Robert W. Hook, Consultant, Austin, TX, and John R. SanFilipo, U.S. Geological Survey, Reston, VA

Edited by P.D. Warwick, C.E. Aubourg, and J.C. Willett

U.S. Department of Interior U.S. Geological Survey Open-File Report 99-301

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S.G.S.

Copies of this Field Guide are available from:
USGS Information Services
Box 25286 Denver Federal Center
Denver CO 80225-0046
Tel: 303-202-4700;
Fax 303-202-4188

or

http://energy.er.usgs.gov

CONTENTS

Introduction	Tertiary coals in South Texas: Anomalous cannel-like coals of Webb	
	County (Claiborne Group, Eocene) and lignites of Atascosa County	
	(Jackson Group, Eocene)	
	Peter D. Warwick, Robert W. Hook, John R. SanFilipo	1
	Itinerary	
	Other Information	
Chapter 1	Regional geologic setting of South Texas and the Santo Tomas coal deposits	
	Thomas E. Ewing	5
	Introduction	5
	General Overview of the Field Trip Route	5
	Structural and Stratigraphic Setting of the Santo Tomas District	
	References Cited	
Chapter 2	The San Pedro and Santo Tomas Coal Beds (Claiborne Group, Eocene) of Webb County, Texas	
	Robert W. Hook and Peter D. Warwick	13
	Introduction	13
	Geologic Setting and Stratigraphy	13
	Mining History	
	Depositional Setting	
	Coal Characteristics	
	Summary	20
	Acknowledgments	
	References Cited	
Chapter 3	The San Miguel lignite deposit, Jackson Group (Eocene), South Texas <i>Peter D. Warwick, Sharon S. Crowley, Leslie F. Ruppert, and James</i>	
	Pontolillo	23
	Introduction	
	Geologic Setting	
	Lignite Resources and Mining	
	Character of the San Miguel Lignite	
	Megascopic characteristics	
	Proximate analyses	
	Major, Minor, and Trace element data	
	Mineralogy of San Miguel Partings	
	Palynology and Organic Petrology	
	raiyhology ahu Organic rehology	31

	Relationship Between Ash yield, and Petrographic and	
	Geochemical Characteristics of the San Miguel	
	Lignite Deposit	33
	Summary	
	Acknowledgments	
	References Cited.	
	References Cited	J -1
Chapter 4	Some speculations on coal rank anomalies of the South Texas	
-	Gulf Province and adjacent areas of Mexico and their impact on	
	coal bed methane and source rock potential	
	John R. SanFilipo	37
	Introduction	
	Cretaceous bituminous coals.	
	Tertiary bituminous and related coals	
	Extent of the coal rank anomaly and its possible impact on	51
	hydrocarbon generation	42
	Conclusions	
	Acknowledgments	
	References Cited	
	References Cited	40
	FIGURES	
Introduction		
Figure	1. Map showing outcrop of coal-bearing formations in the U.S.	
C	Gulf of Mexico coastal area	2
Figure		
8	Mexico Coastal Plain.	3
Chapter 1		
Figure	1. Route of the 1999 EMD field trip, with major tectonic features	
	and outcrop belts shown	6
Figure	2. General northwest-southeast stratigraphic section of Mesozoic	
	and Paleogene strata along the Rio Grande, from Eagle Pass	
	to Freer	7
Figure	3. Subsurface structure, Top Middle Wilcox marker, Santo	
S	Tomas area	9
Figure		-
= -8.22	showing the correlation from surface mines to subsurface	
		10

Chapter 2

Figure 1. Figure 2.	Location of study area, undergroun mine entries and prospects	14
118010 21	include both coal zones	15
Figure 3.	Bed sections and sample intervals of the San Pedro, Santo Tomas, and Santo Tomas rider coal beds	16
Figure 4.	Selected proximate and ultimate data	
Figure 5.	Schematic block diagram of depositional environments for the San Pedro and Santo Tomas coal zones in the middle	20
	part of the Claiborne Group	20
Chapter 3		
Figure 1.	Index map of the San Miguel Mine area showing towns, roads, and sample sites.	24
Figure 2.	Generalized stratigraphy and stratigraphic sections of the	
\mathcal{E}	coal-bearing interval at the san Miguel Mine	25
Figure 3.	Representative photographs and photomicrographs of outcrops	
	and samples from the San Miguel lignite interval	26
Figure 4.	Bar graphs shoing concentrations of ash yield, total sulfur, and caloric values	27
Figure 5.	Bar graphs showing the distribution of trace element concentrations for twelve potentially environmentally sensitive elements identified by the 1990 U.S. Clean Air Act	
	amendments	29
Figure 6.	Bar graphs showing the distribution of trace element concentrations for those elements inferred to be derived	_,
	from volcanic ash	30
Figure 7.	Bar graphs of the major petrographic constituents for the channel sample	
-	sets	32
Chapter 4		
Figure 1.	Generalized columnar section for South Texas coal areas and	
Eigung 2	adjacent areas of Mexico	38
Figure 2.	Regional geology and location of bituminous coal deposits of South Texas and adjacent areas of Mexico	30
Figure 3.	Standard analysis and elemental ratios for selected samples from	37
	the Santo Tomas coal field and Sandow Mine	41
Figure 4.	Selected rank parameters for selected samples from the Santo	-
-	Tomas coal field and Sandow Mine	43
Figure 5.	Van Krevelen-type diagram for various coal types of South Texas	
	and vicinity	45

